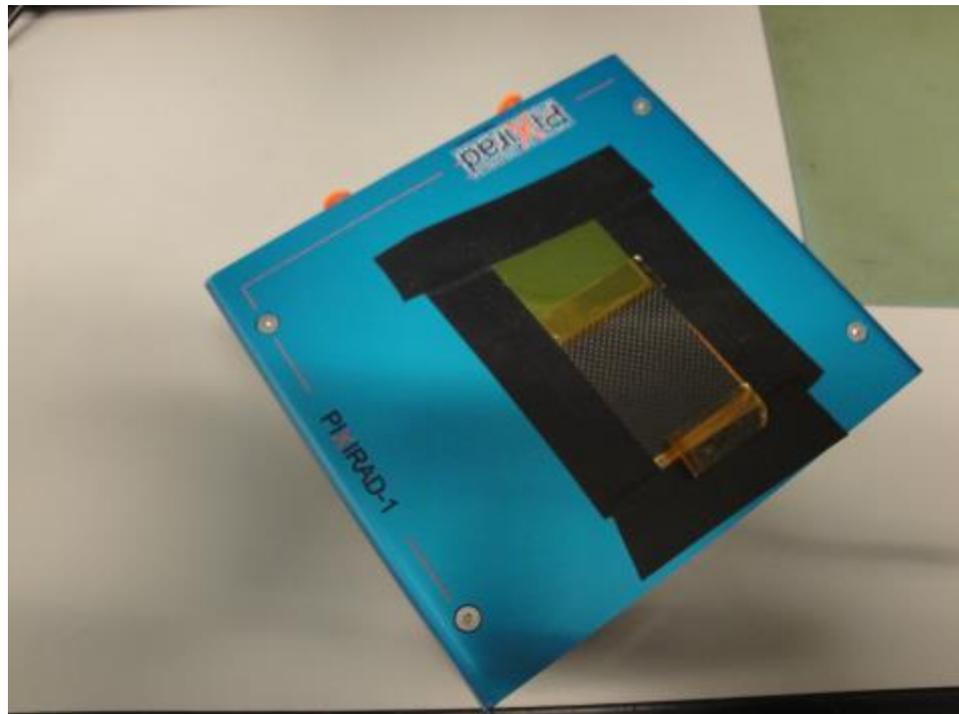


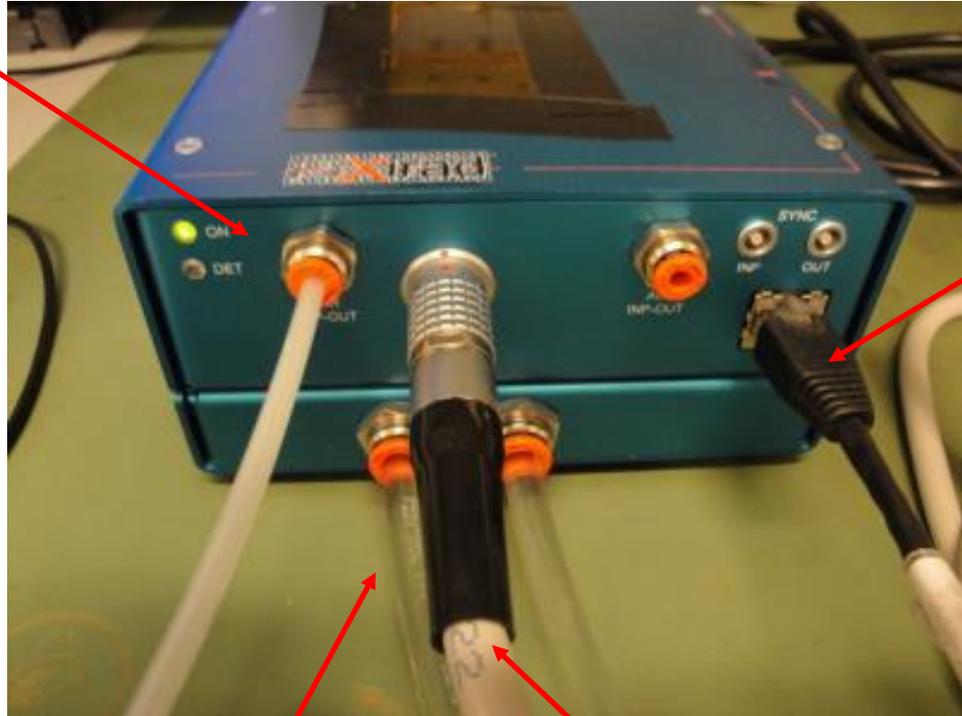
Pixirad-1: Area Detector with CdTe Sensor Detector Pool Guide



Quick Start: Mechanical Connections

Air flow, OD: 4mm
Necessary to avoid condensation within the detector enclosure. Flow rate: 0.5 liters/minute (≤ 3 liter/min for best performance).

NOTE: Please disconnect the air from the detector while adjusting the flow. Over pressuring will tear the Mylar film!



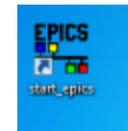
Cat 5 or 6: Connects to 2nd ethernet card on PC (in expansion bus)

Chiller lines

From power supply

Quick start

- Mounting detector to your experimental setup:
 - Please mount with M3 screws – several mounting holes are available on the sides or bottom (remove rubber feet) of the detector head.
 - Mounting plate is available from the DP staff.
- IOC Startup:
 - Login information:
 - Ask Detector Pool for Login information. Ext 2-9490
 - Ensure that the chiller is connected and running
 - Ensure that the detector power supply is turned on (switch on back of 2nd box).
 - IOC startup icon is on the desktop:
 - Clicking will launch both the ioc and medm screen
- After dry gas has flowed for a few minutes, turn cooling on. Recommended to run at -30°, but ensure that setting is not below dew point or sensor will ice up.
- HV settings: Run at 400V once chilled. Leave “HV Mode” in “auto” and “HV State” in “off”. HV is turned on automatically once you start an acquisition.
- Run “Auto Calibrate” before taking data.



Medm Screen

pixirad.adl

Pixirad Detector Control - 13PR1:cam1:

Setup

asyn port **PIXI**
 EPICS name **13PR1:cam1:**
 Manufacturer **Pixirad**
 Model **Pixirad 1**
Connected

Connection
 Debugging

Shutter

Shutter mode
 Status: Det. Closed EPICS Closed
 Open/Close
 Delay: Open Close
 EPICS shutter setup

High Voltage

HV mode **Auto**
 HV state **Off**
 HV setpoint **400.0 V**
 HV value **0.0 V**
 HV current **0.0 nA**

Collect

Exposure time **0.010**
 Acquire period **0.000**
 # Images **1000**
 Images collected **0**
 Colors collected **0**
 UDP buffs read **0**
 UDP speed (MB/s) **0.0**
 UDP buffs free/max **1500/1500**
 Frame type **2 color DTF**
 Trigger mode **Internal**

Done

Acquire
 Image counter **0**
 Image rate **0.0**
 Array callbacks **Enable**

Environmental

Cooling **Off**
 Setpoint **5.0 C**
 Cold Temp. **22.8 C**
 Hot Temp. **17.5 C**
 Box Temp. **24.8 C**
 Box humidity **14.5%**
 Dew point **-4.1 C**
 Peltier power **0.0%**
 Status OK

Plugins

Detector

Detector Size **476 512**
 Threshold 1 (keV) **10.0**
 Threshold 2 (keV) **29.7**
 Threshold 3 (keV) **29.7**
 Threshold 4 (keV) **29.7**
 Sync in polarity **Pos.**
 Sync out polarity **Pos.**
 Sync out function **Read dor**
 Auto calibrate
 System reset

Attributes

File

Status

Status: Server returned OK
 To server: **DAQ:! INIT 5.0 0 400.0 0**
 From server: **DETECTOR 1022 GOT: DAQ:! INIT 5.0 0 400.0 0%**

A few notes about detector operation

- Detector has 2 counters per pixel, and two discriminators per counter
 - Thresholds determine discriminator settings
 - Frame type field configures discriminators and counters:
 - 1 color low – acquires single image using lower discriminator
 - 1 color high – acquires single image using upper discriminator (threshold 2)
 - 2 color – implements both discriminators in single counter. Actually records 2 images to output file.
 - DTF modes – Reads out single counter while other counter is being used to acquire data. Permits fastest data acquisition... Not well tested!
 - 2 color DTF uses threshold 1 and 3
- Images are saved through Area Detector plug-ins. 2 or 4 color modes can only be saved through NetCDF or HDF formats.
- First image of multi-image acquisitions is always blank.
- “Stop” image acquisition does not work properly, and will require detector reset (red button on lower left) before resuming detector operations.
- “Acquisition Period” is used to increase the time between images. There is a 8ms readout time per counter, and the detector will wait before starting the next acquisition. To maximize your framerate for a given exposure time, set “Acquisition Period = 0.0”

Viewers

- An ImageJ shortcut is available on the desktop
- If ImageJ fails to display your images:
 - Double check that you have the detector properly named in the ImageJ plugin.
 - On the medm screen, ensure that “array callbacks” and the Image1 plug-in are both enabled.



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PiXirad
Imaging Counters s.r.l.

The Chromatic Photon Counting

The PiXirad imaging sensors

**PIXIRAD-1: a single unit system, 250K pixels, 500K counters
3x2.5 cm² active area**

Sensor specs:	
	CdTe, 650 μm, 30.9 × 25.0 mm ² Schottky type diode Electron collection at pixel
ASIC+CdTe base block	512 × 476 pixels
Number of blocks	1
Global active area	31 x 25 mm ²
Total number of pixels	243712
Total number of counters	487424
Pixel size	60 μm hexagonal arrangement
Pixel density	323 pixels/mm ² , equivalent to 55 μm on square arrangement
Pixel rate capability	10 ⁶ counts/pixel/s (after dead-time correction)
Global rate capability	2.4x10 ¹¹ counts/s
Pixel dead-time	300 ns
Position resolution	11 line pairs/mm at MTF 50%
Reading while taking data	possible
Energy range	1-100 keV
Detection efficiency @10 keV, 25 keV, 50 keV	100%, 100%, 98%
Counters depth	15 bits
Read-out time @50 MHz clock	5 ms/counter
Frame rate	200 readouts/s
Minimum applicable global threshold	200 electrons
Sensor bias voltage	200 + 400 V
Leakage current density	5 nA /cm ² at 400 V, -20 °C
Typical number of defective pixels	less than 1%
Number of independent thresholds (colors)	2 set of two (swappable in real time)
Camera specs:	
Size (WxLxH)	14x14x7 cm ³
Weight	< 2Kg
Power consumption	60 Watts (typical)
Cooling	liquid or forced air
Operating temperature	+40 -40 °C

Web page and content by: [Gloria Spandre](#)